strels have carried it about; men have sung their songs in field and forest; women have sung their songs at the oven and the loom; boys have sung their songs while driving the herds to pasture, and girls while milking cows; and there are songs for all times and all conditions and all peoples. Song has ever remained as folk-music, the delight of the people.

There are songs celebrating all passions, — all joys and all sorrows, all hopes and all fears, all loves and all hates. All the emotions of the human soul are coined into song. Song is the reservoir into which all human feelings are poured, and it is the fountain from which all human feelings may be drawn. And this is true not only in our language, but in all languages.

When harmony was given to music through its association with the drama, musical compositions were no longer confined to simple songs for the field, the fireside, and the chapel, but great pieces were composed for the temple and theatre, and music was made to express the emotions of religion and romance, as in the oratorio, cantata, and opera. This music bore on its wings the hope of heaven and the fear of hell. It told of the joy of the angels before the throne of God, and of the torments of demons in the presence of the Devil. The profane music of this period related biographies and histories filled with love and revenge, virtue and crime, courage and cowardice, repose and tragedy. Music in this stage is freighted with the feelings that are kindled and expressed by laughter and crying, by prattle and wrangling, by caresses and blows, by kisses and frowns, by praise and reproof, by plenty and poverty, by strength and weakness, by health and disease, by birth and death, by festivals and funerals, by carnivals and battles, by peace and war, by victory and defeat, by justice and injustice.

And now we must speak of the symphonic stage of music, when science has given it a multitude of sweet instruments.

The art of music was not born of the music of Nature: it was born of the pains and pleasures, the joys and sorrows, of mankind.

The appreciation of the beauties of nature is of slow growth; and it is only in civilization, and with the most cultured people of civilization, that these beauties are sources of joy; and it is only in the latest music that the highest intellectual pleasures are expressed. The beauties of the earth, the sea, and the air and the sublime spectacle of the heavens, are gradually being wrought into the emotional nature of mankind; and the new music is informed with the strains that are played by Old Ocean against the shores of every land. It is filled with the anthem-music of the forest, and the songs of the birds that chorus the round earth with the rising sun.

In its late history new attributes have been added from the contemplation of nature. These are feelings kindled by the higher intellectual activities. The human reason has acquired a knowledge of the universe, and derived exalted emotions therefrom. The boundless sea now tells its story. From arctic and antarctic lands navies of icebergs forever sail, to be defeated and overwhelmed by the hot winds of the tropics. The lands with happy valleys and majestic mountains rise from the sea, built by the waves and fashioned by fire and storm. Over all rests the ambient air, moving gently in breezes, rushing madly in winds, and hurling its storms against the hills and mountains of the sea and the hills and mountains of the land.

The land, the sea, and the air are the home of a world of life, which man studies with ever-increasing interest and pleasure. The solid earth is composed of crystalline forms, and exhibits chemical activities which ever challenge admiration. Sound and heat, and light and electricity, and vitality and mentality, present modes of motion the contemplation of which fills the mind with delight. Looking above the earth, the worlds of the universe are presented to view, and their wonders fill the soul. So music has come to be the language of the emotions kindled by the glories of the universe.

Thus is seen the growth of music in four stages, — music as rhythm, music as melody, music as harmony, and music as symphony. Rhythm was born of the dance, melody was born of poetry, harmony was born of drama, symphony was born of science. The motive of rhythmic music was biotic exaltation, the motive of melody was social exaltation, the motive of harmony was religious exaltation, the motive of symphony is æsthetic exaltation. It is thus seen that music develops from the emotional nature of man, as philosophy has its spring in the intellectual nature. The earliest emotions arose from the biotic constitution, — simple pleasure or pain, as felt in the body and expressed in rhythm: they were mere feelings. Then feelings were idealized, and became emotions, and were expressed in melody; then the emotions were idealized, and became sentiments, and were expressed in harmony; then the sentiments were idealized, and became intellectual conceptions of the beautiful, the true, and the good, and these were expressed in symphony.

Is there a new music for the future? The science of music answers, "Yes." We know that music has been chained to "form," and imprisoned in the Bastile of musical intervals, and guarded by the henchmen of mathematical dogmas. But a few great musical composers, like Wagner, have broken the chains, and burst the bars, and killed the jailers, and they sing their liberty in strains of transcendent music.

When it is desired to cultivate skill in musical performance, it is necessary to cultivate the art in the individual in the same order in which it is cultivated in the race; and he must first master rhythm, then melody, then harmony, then symphony. Then the love for music must be acquired in the same order. No one can love a symphony or an opera who does not first love song. If you would love the higher music, you must love the songs of the people; and to affirm that you love a symphony, or an opera, or a cantata, but that you do not love a song, is like averring that you love a garden but do not love a rose, that you love a bouquet but care not for a lily: for a symphony is indeed but a bouquet of melodies, and an opera is a garden of many flowers.

Happy is the home that is filled with song, where boys and girls sing the melodies of the people, and where they make these melodies more musical with the violin, the piano, or the flute; for to music is consigned the purest joy.

NOTES AND NEWS.

IN addition to the election of Dr. Weir Mitchell as president of the next Congress of American Physicians and Surgeons, to be held in September, 1891, which we have already noticed, Dr. W. H. Carmalt of New Haven was elected secretary; Dr. J. S. Billings of Washington, treasurer; Dr. William Pepper of Philadelphia, chairman of the executive committee; and Dr. S. C. Busey of Washington, chairman of the local committee of arrangements. Dr. C. H. Mastin of Mobile is reported to have declined the presidency, on the ground that no member of the executive committee ought to be elected to the presidency.

— The fifty-eighth annual industrial exhibition of the American Institute of this city is now in progress at the Institute building, on Third Avenue, between Sixty-third and Sixty-fourth Streets. The building is well filled with tastefully arranged exhibits, covering a wide range of industries, several in which manufacturing processes are shown being especially attractive and interesting. The electrical exhibits are not as numerous as might be expected, there being only three electric-light companies and a few manufacturers of electrical instruments represented.

— In view of the reports which have recently been published respecting the Johns Hopkins University, President Gilman authorizes the statement that the university will begin its next year on the 1st of October with unimpaired efficiency. Neither the salary of the president nor those of the professors have been cut down, and several new appointments have been made. The indications during the summer have pointed to the usual number of students, and the courses of instruction will be given as announced in the programme. As to the finances of the university, it is no secret that the income derived from the Baltimore and Ohio Railroad was cut off some time ago; but the accumulated income of former years, the income from investments outside of the railroad, the income from tuition (which amounted last year to nearly $40,000), are available. Besides all this, a number of generous persons have

subscribed the sum of $108,000, to be expended as an emergency fund during the next three years. In addition, a new building, given by Mr. Eugene Levering of Baltimore, is now going up. A lectureship in literature has been endowed by a gift of $20,000. By the death of John W. McCoy the university inherits at once his choice library of 8,000 volumes, and is the residuary legatee of his estate. The exact amount to be received from this source cannot yet be ascertained, but the most prudent estimates place it above $100,000, exclusive of the library. This gift is free from conditions. It is safe to say that within six months the Johns Hopkins University has received from these various sources nearly $300,000, and other gifts are expected. The national character of the institution is a strong reason why its work should receive important aid from a distance. It will thus be seen that no consideration need be given to alarming rumors, as the present efficiency of the university is assured for the next three years.

— By the will of Mr. John W. McCoy, who died in Baltimore Aug. 20, 1889, the Johns Hopkins University is made the residuary legatee of his estate. His large and valuable library is also left to the university. His art collection is bequeathed to the Peabody Institute. A fuller statement as to this valuable gift will be subsequently made.

— President Hall of Clark University, Worcester, Mass., in an official statement, thus defines the functions of docent in the university: "The highest annual appointment is that of docent. This rank and title is primarily intended as an honor to be awarded to those worthy of more permanent and lucrative positions, as professors or assistant professors in colleges. It may be bestowed without examination upon a few men who have advanced beyond the requirements of a doctorate, and who satisfy the authorities of the university by a thesis, a public address, or in any other way, of both their scientific attainments and their teaching ability, and, if necessary, may be accompanied by a salary. Docents may be provided with individual rooms; and special apparatus may be purchased for their research if desired and approved. They may also be equipped and sent on scientific expeditions. While they will be expected during some part of the year to deliver a limited number of lectures on some special chapter of their department, their time will usually be reserved for study and research in a way best adapted to qualify them still more fully for academic advancement. It is believed that by the existence of such a select body of men of guaranteed scientific training, ability, and approved power to teach, the difficulties under which college trustees sometimes succumb in selecting suitable men for the professors may be diminished, and that otherwise this new academic grade will aid in raising standards of scholarship in colleges, and encouraging scientific research." The work of the university has begun. The professors and instructors in the departments of mathematics, physics, chemistry, biology, and psychology met their students Monday, Oct. 7. The following lectures were delivered: by Dr. Bolza, in mathematics, Oct. 8; by Dr. Cook, in psychology, Oct. 7; by Dr. Sanford, in psychology, Oct. 8. Dr. Donaldson gave an introductory lecture on Oct. 9 in the neurological laboratory.

— In the *Michigan Engineers' Annual*, which is the report of the proceedings of the Michigan Engineering Society, of January, 1889, Professor M. E. Cooley, M.E., of Ann Arbor, gives the following experience on the value of covering steam-pipes: "The benefits of covering steam-pipes to prevent radiation are strikingly illustrated by the following example: The Thomson-Houston electric-light plant in Ann Arbor has about 60 feet of 7-inch pipe, connecting the boiler with the engines, and two large steam-drums above the boilers. In March, 1887, the steam at the far end of this pipe was tested to determine the amount of entrained water, the pipes and drums at the time being uncovered. An average of nine experiments gave 31.01 per cent of moisture. In June of the same year, after the pipes were covered with magnesia sectional coverings, the quality of the steam was again tested, the average of five experiments giving 3.61 per cent moisture. The tests were made by the same men, from the same connections, and in the same manner. The pipes and steam-drums in March were subjected to a draught, which, of course, aided the condensation. Enough water passed into the cylinders to retard the engines, producing a disagreeable noise. In June the weather was warmer, and the pipes and steam-drums were well protected. The quality of steam at the boilers was tested in June, and showed about 3 per cent of moisture. Assuming that 100 indicated horse-power were being developed at the time, and that each horse-power required 30 pounds of steam per hour, we would need 3,000 pounds of steam. If the steam is assumed to have 25 per cent entrained water, due to condensation in the pipes and connections, then 4,000 pounds steam will need to be produced in the boilers, or 1,000 pounds more than necessary. To produce this steam will require about 125 pounds of good coal per hour, or 1,000 pounds per day of eight hours. One-half ton per day, at $3 per ton, for 300 days, equals $450, which, at 6 per cent, pays the interest on $7,500. The actual cost of the covering, put on complete, probably did not exceed $150.

— The deepest bore-hole in the world, claimed at different times for a number of places, is, according to latest accounts, at Schladebach, a small German village near Leipzig. It measures 1,748.4 metres, or about 5,735 feet. The time expended in boring to this depth amounted to six years, at a cost of $52,500. A peculiar experience encountered in connection with this and other deep holes in different parts of Germany is, according to *Uhland's Wochenschrift*, that the observed temperatures, while steadily increasing with the depths, show a smaller ratio of increase in the lower strata.

— In a recent issue of the *Centralblatt der Bauverwallung*, attention is directed to the fact, observed in some of the streets of Frankfort-on-the-Main, Germany, that the asphalt pavement in the immediate neighborhood of large gas mains is rapidly destroyed by escaping gas, deep cracks being formed. This has been found to be particularly marked at places where the underlying layer of beton was imperfect, due to interruption of the work over night while laying. If this is true, it furnishes an additional reason for preventing that escape of gas from the mains in New York City which has already given so much trouble by explosions in subways and sewers.

— How many of the engineering works of the nineteenth century will there be in existence in the year 6000? Very few, it is feared, and still less those that will continue in the far-off age to serve a useful purpose. Yet there is at least one great undertaking conceived and executed by an engineer, which, during the space of four thousand years, has never ceased its office, on which the life of a fertile province absolutely depends to-day. We refer to the Bahr Joussuf, — the canal of Joseph, — built, according to tradition, by the son of Jacob, and which constitutes not the least of the many blessings he conferred on Egypt during the years of his prosperous rule. This canal took its rise, as given in *Engineering*, from the Nile at Asiut, and ran nearly parallel with it for nearly two hundred and fifty miles, creeping along under the western cliffs of the Nile valley, with many a bend and winding, until at length it gained an eminence, as compared with the river-bed, which enabled it to turn westward through a narrow pass, and enter a district which was otherwise shut off from the fertilizing floods on which all vegetation in Egypt depends. The northern end stood seventeen feet higher than low Nile, while at the southern end it was at an equal elevation with the river. Through this cut ran a perennial stream, which watered a province named the Fayoum, endowing it with fertility and supporting a large population. In the time of the annual flood a great part of the canal was under water, and then the river's current would rush in a more direct course into the pass, carrying with it the rich silt which takes the place of manure, and keeps the soil in a state of constant productiveness. And this, with the exception of the tradition that Joseph built it, can be verified to-day, and it is not mere supposition or rumor. Until eight years ago, it was firmly believed that the design has always been limited to an irrigation scheme larger, no doubt, than that now in operation, as shown by the traces of abandoned canals and by the slow aggregation of waste-water which had accumulated in the Birket el Querun, but still essentially the same in character. Many accounts have been written by Greek and Roman historians, such as Herodotus, Strabo, Mutianus, and Pliny, and repeated in monkish legends or portrayed on the maps of the middle ages, which agreed with the folk-lore of the district.

These tales explained that the canal dug by the ancient Israelite served to carry the surplus water of the Nile into an extensive lake lying south of the Fayoum, and so large that it not only modified the climate, tempering the arid winds of the desert, and converting them into the balmy airs which nourished the vines and the olives into a fulness and fragrance unknown in any part of the country, but also added to the food-supply of the land such immense quantities of fish that the royal prerogative of the right of piscary at the great weir was valued at $250,000 annually. This lake was said to be four hundred and fifty miles round, and to be navigated by a fleet of vessels, while the whole circumference was the scene of industry and prosperity.

— A company is now putting down a shaft into Grand Avenue Cave, four miles from Mammoth Cave, for the purpose of bringing up the air and putting it into the rooms of a large hotel which they propose to build, both as a pleasure-resort and sanitarium. They have been able to get no information on the subject, and ask for such in the "Want" column in this number.

— The Shore Line Railway bridge at New London, the largest swing-span drawbridge in the world, is now in position. It was built parallel to the shore along the fender pier, so as not to obstruct navigation, and was swung into place half an hour before sunset Saturday, Sept. 28. It is of solid steel, weighs nearly 2,500,000 pounds, and its connecting parts, when the bridge was swung into position, shot into the mortises of the bridge proper with absolute precision. This was a great relief for the anxious engineers. Some of the highest engineering skill ever employed in bridge-building has been used in the construction of this bridge, the situation involving peculiar difficulties. In some places, says *The Iron Age*, 56 feet of water and 80 feet of mud were found where the piers must be set. There great timber curbs were constructed, and sunk to the total depth of 137 feet. After scooping out the interior mud, the curbs were driven full of piles. These, cut off at a level midway in the curbs, were bound solidly together by filling the spaces with concrete. On this rock-like basis the masonry of the pier was built up. The centre pier is an immense structure 71 feet square. It is flanked on either side by spans of 310 feet, and there are two other spans at either side of the river of 150 feet each. The unusual length of draw was required by the United States Government, that there should be no obstruction to the passage of the naval fleet to the Thames naval station farther up the river. This great bridge, 1,422 feet long, crosses the Pequot River (imitatively named by the first settlers the Thames, while they quite as foolishly named Pequot New London) from a point at the terminus of the Yale-Harvard regatta course at Winthrop's Point, at the upper part of the town.

— According to *Nature*, the International Oriental Congress, which was held this year during the first and second weeks of last month in Stockholm and Christiania, was well attended, and was especially noticeable for the enlightened and warm interest taken in the proceedings by the King. Representatives of Oriental learning from the chief countries were his Majesty's personal guests, the members of the congress present were on several occasions specially entertained by him, and in other marked ways the King showed his desire to honor science and learning in the persons of the assembled Oriental scholars. The *Times* is the only one of the English daily papers in which the proceedings have been followed regularly; and in the last letter on the subject, its correspondent, who has been far from a prophet of smooth things in reference to all the proceedings, says that "this eighth International Oriental Congress was favored above all its predecessors by the right royal splendor with which the ruler of the two countries entertained his guests, by the warm interest which the citizens took in the foreign *savants*, by the care and kindly forethought with which all the arrangements for our comfort had been planned and were carried out, and last (not least) by the grand and lovely natural features of the places which the members visited. Perhaps at future congresses care will be taken that there be less of empty Oriental parade, by which no palpable literary object can be gained, and that greater facilities be given for placing without delay within the reach of members an abstract of the proceedings in each section. However, in the face of such boundless hospitality and such personal sacrifices on the part of our hosts, it would be ungracious were we to take exception to what are, after all, but small matters of detail." A large number of papers of great philological and general interest were read, as will be readily gathered from the following list of the sections, with their respective presidents and vice-presidents: — Section I. Modern Semitic: presidents, Baron Kremer of Vienna, M. Schefer of Paris, M. de Goeje of Leyden. Section II. Ancient Semitic: president, M. Fehr of Stockholm; vice-presidents, M. Chivolson of St. Petersburg, M. Oppert of Paris. Section III.: presidents, M. Max Müller of Oxford, M. Weber of Berlin, M. Spiegel of Erlangen. Section IV.: president, Brugsch Pacha; vice presidents, M. Lieblein, M. Reinisch. Section V.: president, M. Schlegel of Leyden; vice-president, M. Cordier of Paris. Section VI.: president, M. Kern of Leyden; vice-president, Mr. R. N. Cust of London.

— The carrier-pigeon has just been turned to a curious use in Russia, according to the *Novoe Vremya*. It is to convey negatives of photographs taken in a balloon. The first experiment was made from the cupola of the Cathedral of Isaac, and the subject photographed was the Winter Palace. The plates were packed in envelopes impenetrable to the light, and then tied to the feet of the pigeons, who safely and quickly carried them to the station at Volkovo.

— From the general results of the Swiss census of Dec. 1, 1888, which have already been worked out, it seems that the total population is 2,934 055, against 2,846,102 in 1880. The German-speaking element increased from 2,030,792 in 1880 to 2,092,562, which, taking into account the normal growth of the population, was no relative increase, the proportion in both cases being precisely 71.3 per cent of the whole. The French, on the other hand, increased from 608,007 to 637,940, which was also a relative increase of 21.4 to 21.7 per cent; while the Italian declined actually as well as relatively, the numbers being 161,923 in 1880, and 156,602 in 1888, or 5.7 and 5.3 per cent respectively. The decline of the Italians in the cantons of Uri and Schwyz is explained by the return home of a large number of Italian workmen engaged in the St. Gothard Railway; but it is not so easy to explain why there is a large decrease in the Germans in the cantons of Berne and Neuchâtel, while the French have increased. In general the French increase in Switzerland seems to be at the expense of the Germans, while the German element recovers its place at the expense of the Italian.

— Among recent appointments of Johns Hopkins men, we note the following: Edward A. Bechtel (A.B., 1888), professor of Greek in Mount Morris College, Illinois; Edward W. Bemis (Ph.D., 1885), adjunct professor of history and economics in Vanderbilt University; B. Meade Bolton (assistant, 1887–88), director of the Department of Bacteriology in the Hoagland Laboratory, Brooklyn, N.Y.; David T. Day (Ph.D., 1884), expert and special agent in charge of the subject of mines and mining for the eleventh census; John C. Fields (Ph.D., 1887), professor of mathematics, Allegheny College, Pennsylvania; Andrew Fossum (Ph.D., 1887), classical instructor, Hill School, Pottstown, Penn.; J. Edward Harry (Ph.D., 1889), professor of Greek and German in Georgetown College, Kentucky; George L. Hendrickson (A.B., 1887), professor of Latin in Colorado College; George N. C. Henschen (A.B., 1889), instructor in natural sciences in the Reading (Penn.) High School; William H. Howell (Ph.D., 1884, and associate professor), lecturer on physiology in the University of Michigan; Frank G. Hubbard (Ph.D., 1887), instructor in English in the University of California; Cary T. Hutchinson (Ph.D., 1889), docent in physics in Clark University; James T. Lees (Ph.D., 1889), principal of the Latin School, and instructor in Latin and Greek in the University of Nebraska; Henry Sewall (Ph.D., 1879, and recently professor in the University of Michigan), professor of physiology in the College of Physicians and Surgeons, Baltimore; Moses S. Slaughter (fellow, 1885–86), professor of Latin in Iowa College; Professor Albion W. Small (Ph.D., 1889), president of Colby University, Maine; William E. Story (associate and associate professor, 1876–89), professor of mathematics in Clark University; James S. Trueman (fellow, 1888–89), professor of Greek and Latin in Allegheny College, Pennsylvania.